CITY OF FLORENCE
RULES AND REGULATIONS FOR WATER INSTALLATION

PART 1 – GENERAL

1.01 INTRODUCTION - These Rules & Regulations set out herein enables the City of Florence to carry out its responsibilities and assure adequate potable water supply for the general public for human consumption, fire protection and other uses. The Rules & Regulations through recognition of these purposes promote the public health, safety and welfare through the provisions of surveys, inspections, measurements, taking of samples and proper testing of water and sanitary sewer manholes for compliance with applicable government regulations and public laws. In addition, facilities integral to the distribution of potable water are subject to inspections and various testing for ongoing maintenance as well as initial installations and, further, the distribution system as a whole undergoes study and review for adequate supply and service pressure, and for various improvements or repairs when and where needed.

Unless modified, deleted, replaced, or otherwise changed, the latest published addition of the following documents shall be the accepted standards for materials and/or procedures for the construction of water mains, appurtenances, sanitary sewer lines, manholes, surface water-storm water lines and appurtenances:

A. City of Florence Rules and Regulations
B. City of Florence Standard Drawings
C. City of Florence Ordinance 0-23-86
D. Natural Resources & Environmental Protection Cabinet, Division of Water
E. American Water Works Association's Standards (AWWA)
F. Recommended Ten State Standards for Water Works

If a conflict exists between referenced sources, the more restrictive requirements shall prevail. The City of Florence shall provide interpretation as requested.

1.02 DESCRIPTION- In general the following specifications are minimum requirements for public water mains design and installation. New design ideas and concepts are welcome by the City of Florence but subject to the City of Florence approval. Construction may be dictated by location, soil conditions, ground water, topography, etc. Additional provisions may be required by the City of Florence.

1.03 DESIGN GUIDELINES Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and standards. Deviation from applicable laws, rules, regulations and standards will only be considered with appropriate justification submitted to the City of Florence. The proposed project may be constructed only in accordance with the approved plans. Plans submitted to the City of Florence for approval shall be on a 1" = 50' scale and plan sheets no larger than 24" X 36". It is strongly recommended that the design engineer meet with the City of Florence prior to plan submittals for review of overall project. Extensions from and connections to the public water system will be approved by the City of Florence where proper pressures and flows permit, provided there is a sufficient water supply developed and available for domestic use and fire protection to take on new or additional extension or service without detriment to those already served. The City of Florence engineer will run a hydraulic analysis for every new line public water main extension to ensure adequate water is available.

Water lines must be sized to meet the demands anticipated for the total development being designed. The design engineer and/or developer are responsible for properly sizing public water mains to meet required demands of the development. Public water mains shall be installed in a public right of way with the exception of cross-country lines installed to eliminate dead ends and public water mains installed on private property, which are going to be maintained by the City of Florence. To allow for the future extension of the public water system in an orderly manner, the water system shall be constructed to the developer's property limits which abut a proposed or existing public right-of-way or has a potential for future development and the termination shall be as described in the Rule and Regulations of the City of Florence or by connection to an existing main. All improvement plans shall consist of street layout, lot or building layout and number, water main and appurtenance locations, and location of other utilities that may be in conflict. The Developer or Design Engineer is responsible to maintain an unobstructed area for the placement of the water main and appurtenances and allow no conflict with other utilities other than crossing of laterals. Utility laterals shall maintain a minimum of 18" outside diameter to outside diameter clearance (except for storm and/or sanitary laterals), 18" clearance below the water main unless otherwise approved by the City of Florence.

The four (4) foot area over the water main, (3' from curbside) shall be a non-paved, strip totally unobstructed with the exception of:

a) removable, post type mail boxes;
b) utility laterals (gas, electric, telephone, and cable television) maintaining a minimum of 18" outside diameter to outside diameter clearance;
c) no more than 30' of continuous pavement used as driveways or parking pads;
d) street and sidewalk crossings;
e) sidewalks (may not be over main, but could encroach on this four (4) foot area on street radius, curves, and cul-de-sacs);

The 20' (public right-of-way) area over the water main, centered (10' either side) shall be totally unobstructed with the exception of:

a) items listed above;
b) streets, curbs, and gutters;
c) sidewalk pavement;
d) storm drainage appurtenances

Additional requirements may be required for subdivision plans submittals that create double frontage lots (a lot other than a corner lot that has frontage on more than one public street) along public streets that currently do not have public water. The developer may be responsible for extending the water main along both sides of the double frontage lots if the property would benefit from the extension. If there were a future potential that a water main extension may be made by the City of Florence Extension Policy along the existing public street would be beneficial, as determined by the City Of Florence, an agreement would need to be signed between the developer and the City of Florence.

1.04 PLAN SUBMITTALS- All plans submitted must be dated and bear the stamp and signature of a Professional Engineer registered in the Commonwealth of Kentucky. Improvement plans shall be submitted in duplicate for preliminary review by the City of Florence. One copy of the improvement plan will be returned to the Engineer for

corrections to meet City of Florence Standards. The Engineer will need to revise and resubmit seven (7) sets of improvement plans along with a check for $150.00 submittal fee made payable to the Ky. State Treasurer for final review by the City of Florence and Ky. Division of Water. The name of the project should be on the check. Ky. Division of Water's review fee for projects over 10,000 feet of water main will be $325.00. The City of Florence requires a copy of the plans in a digital format of (2) 3.5" floppy disc, CD Rom writeable disk, or E-Mail file to Boone County GIS Department, AutoCAD Version 12 or later for input on the City of Florence GIS System.
Distribution of approved plans will be made by the City of Florence as follows: Six (6) copies submitted to the Ky. Division of Water. In accordance with Ky. Regulation 401 KAR 8:100 construction of the submitted project cannot begin until written approval has been received from the Ky. Division of Water; one (1) copy to Boone County Planning and Zoning, and two (2) copies returned to the Design Engineer when approval is received from the Ky. Division of Water, it is signed and returned to the City of Florence by the Developer.

1.05 WATER MAINS ON PRIVATE PROPERTY- Water mains installed on private property which are going to be maintained by the City of Florence, shall have a twenty (20) foot wide easement with the water main centered in the easement area. A four (4) foot area over the water main shall be a non-paved strip totally unobstructed with the exceptions as outlined in Rules and Regulations (1.03). With appropriate justification, paving may be approved within the four (4) foot area over cross-country water mains. Outside the ten (10) foot area over the water main, 5' either side but within the overall easement area, other utilities may be placed in this area. Proper documentation shall be provided for all easement areas. The Design Engineer shall prepare an easement document suitable for recording with the Boone County Clerk. Documents shall consist of a sketch (8 ½" by 14"), a legal description of the twenty (20) foot easement with back references to Deed Book and Page number, and a signed Grant of Easement Form (Restoration agreement) provided by the City of Florence prior to filling the main for sterilization.

1.06 WATER MAIN SIZE- Minimum public water main size shall be 8" unless approved by The City of Florence. All water mains 16" and larger shall be min. class 52 DIP as determined by the City of Florence. The City of Florence does not allow water mains 14" & 18" in size.

1.07 DEAD ENDS OF WATER MAINS- Dead ends to water mains shall be prohibited unless approved by the City of Florence. Dead ends may be approved if one or more of the following conditions exist:

A. The distance between the dead end and the other tie-in point is greater than 600 feet.
B. Physical features exist between the dead end and the other tie-in point that in the opinion of the City of Florence make it impractical to tie them together.
C. Slopes between the dead end and the other tie-in point is greater than 3-1.
D. Slopes/terrain between the dead end and the other tie-in point is certified as geotechnical unstable by a qualified professional engineer.
E. It is necessary to purchase easements to run a water line through existing developed lots.

The City of Florence reserves the right to require certain dead ends to be connected even though they meet the above conditions. All dead end lines must be provided with a fire hydrant. Cul-de-sac streets of less than 300 feet long may be considered for the installation of a 6" D.I. or PVC looped water main for the elimination of the dead end. A fire hydrant shall be installed at the intersection of the cross street and a valve installed between the two tees for the 6" line.

1.08 MULTIPLE WATER MAIN FEEDS- A minimum of two supply sources shall be required for subdivisions of one hundred (100) customers or more, more than one street, and/or there is potential development area that exceeds the number of customers or streets previously mentioned.

1.09 MINIMUM WATER FLOW REQUIREMENTS- The water main extension at the most remote location shall be able to provide a minimum fire flow of 250 gpm for the installation of fire hydrants and the water system supporting this flow must have the capability of providing this flow for a period of not less than two (2) hours plus consumption at the maximum daily rate. A minimum of 30 psi must be available on the discharge side of all meters.

1.10 HIGH PRESSURE AREAS- Additional requirements may be necessary for high-pressure areas (125 psi static pressure or higher) as determined by the City of Florence.

1.11 VALVES- Sufficient valves as determined by the City of Florence shall be provided on water mains so inconvenience and public health hazards are minimized during repairs, and their location shall be approved by the City of Florence. All valves shall be operated by or under the direction of the City of Florence personnel only. Valves shall be installed at each end of cross-country water mains.

1.12 FIRE HYDRANTS- Fire hydrants shall be connected only to water mains adequately sized to carry fire flows and in no case to lines smaller than six (6) inch. Fire hydrant spacing shall be 500' maximum as recommended by the City of Florence and the local fire departments. Fire hydrants shall be located on or as close to side property lot lines as possible.

1.13 PARALLEL INSTALLATION OF WATER AND SEWER LINES- Water lines must be located at a minimum lateral distance of ten (10) feet from any existing or future sanitary sewer lines and sanitary sewer manholes measured from outside diameters. Where a water line must be placed in the same trench as a gravity sewer line, the water line shall be located on shelf 18" above and 18" to the side of the sewer line. This deviation will not be allowed for force mains.

1.14 CROSSING OF WATER AND SEWER LINES- Water lines crossing under sewer lines, or crossing less than eighteen (18) inches above sewer lines, on full length of water pipe shall be located so both joints will be as far from the sewer line as possible. Special structural support for the water and sewer pipes may be required.

1.15 WATER CROSSING- Surface water crossings, both over and under water, present special problems which should be discussed with the City of Florence before

improvement plans are prepared. Over water crossings are not recommended unless permission has been granted by the City of Florence. Where the water line is constructed under a stream (drainage ditch or blue line), the pipe shall be protected with concrete encasement. This encasement shall extend a distance equal to the width of the channel measured from top of bank to top of bank. Valves shall be installed on each side of the water crossing in areas not subject to flooding when the crossing water courses greater than 15 feet in width (bank to bank). Permanent taps shall be installed on each side of the system side valve for leakage and sampling purposes.

1.16 SAFETY- The "Manual of Accident Prevention in Construction" published by the associated Contractors of America, OSHA Regulations and other state and local safety regulation shall be followed. *Failure to follow proper safety rules will result in job shut down.*

1.17 MAINTENANCE PERIOD- The Developer shall be responsible for the maintenance of the installed water mains and appurtenances to City of Florence Standards for a period of not less than one (1) year from the date the water main is placed in service, which City of Florence will send a letter to the developer when water main goes into service and release of the water main to the City of Florence, and inspection will be conducted by the City of Florence to ensure that the water main and appurtenances were installed and maintained to City of Florence standards. If the 10-month inspection reveals that the installation does not meet City of Florence standards, the developer will be notified in writing to correct all discrepancies and/or problems within 60 days after notification. If the problems are not corrected within the 60-day period, the City of Florence shall make the necessary plans to have corrections taken care of at the Developer's expense. Any outstanding bill must be paid before water will be furnished to the Developer's existing and future water main projects and/or phases until all bills are paid in full.

1.18 APPLICATION FOR SERVICE- Application for water service will only be accepted after the water main bacteria samples are shown to be negative following disinfection and the main is placed in service by the City of Florence. No service installation will be scheduled until the water main is approved and turned on.

1.19 CONDUITS FOR WATER SERVICES ON OPPOSITE SIDE OF WATER MAIN- The developer will be responsible to run conduit pipes for each lot that is on the opposite side of the water main. These conduits shall be 4" minimum in size and the must come across to the center of the lot from the center of the lot. The street shall be marked in the concrete curb with a "W" according to the crossover plan. The City of Florence will provide a crossover plan to the developer.

PART II – MATERIALS

2.01 WATER MAIN PIPE AND FITTINGS

A. Class 50 Ductile Iron Pipe (D.I.P.) – Class 50 Ductile Iron Pipe shall conform to the latest edition of AWWA C151. All pipes shall be clearly marked as to class by the manufacturer. Class 50 D.I.P. shall be permitted for use throughout the City of Florence System. All DIP pipe shall be wrapped with a Polyethylene Wrap (See 2.02). Class 50 D.I.P. shall be required according to the sea elevation of 800 or

below. Class 50 DIP is for size pipe 8" and smaller. Class 52 DIP shall be used for 12" and higher.

B. Polyvinyl Chloride Pipe (PVC) – DR 14, Pressure Class of 200 psi shall conform to the latest edition of AWWA C900, must be NSF approved and manufactured in accordance with ASTM standards. All pipes shall be clearly marked as to class by the manufacturer. The outside diameter shall be equivalent to D.I.P. Pipe shall have gasket bell end type joints furnished complete with gaskets meeting the latest edition of ASTM F477. Solvent weld joints are prohibited. This shall be required according to the sea level elevation between 800-850.

C. Polyvinyl Chloride Pipe (PVC) – DR 18, Pressure Class of 150 psi shall conform to the latest edition of AWWA C900 must be NSF approved and manufactured in accordance with ASTM standards. All pipes shall be clearly marked at to class by the manufacturer. The outside diameter shall be equivalent to D.I.P. Pipe shall have gasket bell end type joints furnished complete with gaskets meeting the latest edition of ASTM F477. Solvent weld joints are prohibited. This shall be required according to the sea level elevation above 850.
PVC Pipe Shipping, Handling, and Storage – The front end of all pipe delivered by truck shall be covered for protection against exhaust fumes. PVC pipe shall be protected from exposure to sunlight according to manufacture's recommendations. Pipe will not be accepted for installation if discoloration is evident due to sunlight or other exposure. Pipe shall be stored in such a manner to prevent beaming the pipe.

D. Tracing Wire - All PVC type pipe shall be installed with a 12 gauge solid copper (PVC coated) tracing wire taped to the top of the pipe every 5'. Maximum tracing wire length shall be 500' without terminating in a curb stop box. Water main installations that stop short of the permanent fire hydrant tee, the tracing wire shall be terminated in a curb stop box. Curb stop boxes shall not be located in pavement areas. Splices in the tracing wire shall be kept to a minimum and approved by the City of Florence. If splices are required, they shall be made with copper split bolt (llsco #K-8 or approved equal) and taped with electrical tape. Should the type of pipe change to DIP, the tracing wire shall be terminated in a curb stop box at the point where the transition is made.

E. Fittings - All fittings and accessories shall be Ductile Iron, rated for a minimum of 200 psi working pressure or as specified herein. The fittings and accessories shall be new and unused. All pipefitting shall be mechanical joint fittings. Mechanical joints shall conform to AWWA C111. Bolts and nuts shall be high strength corrosion resistant alloy, such as "Cor-Ten" or approved equal. Ductile Iron Compact Fittings shall conform to AWWA C153 and Full Body Fittings to AWWA C110. A bituminous seal coat shall be applied to the outside of the fitting. All ductile iron fittings shall be cement lined and seal coated in accordance to AWWA C104.

2.02 POLYETHYLENE WRAP

All ductile iron pipe, fittings, valves and fire hydrant leads shall be polyethylene wrapped, installed according to the current edition of AWWA C105/A 21.5. Ductile iron fittings, valves, and fire hydrant leads used in the installation of PVC pipe shall be included. Polyethylene wrap shall be 8-mil thickness low-density film or 4-mil thickness high-density cross-laminated polyethylene tube per AWWA C105. The contractor shall cut the roll in tubes 2 feet longer than a standard length of pipe.

Each tube shall be slipped over the length of pipe, centering to allow a one-foot overlap on each adjacent pipe section. After the lap is made, slack in the tubing shall be taken up for a snug fit, and the overlay shall be secured with polyethylene tape. Pipe shall not be wrapped and stored on site for any period of time, but wrapped and immediately place in the trench, fittings shall be wrapped prior to installing blocking or pads.

2.03 VALVES- all valves shall open by turning counter-clockwise with the operation of a 2-inch square-operating nut. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends except Tapping Valves.

A. GATE VALVES: Valves 12 inches and smaller shall be resilient seated gate valves, non-rising stem with rubber "O" ring packing seals rated at 250-psi working pressure and conform to the applicable portions of AWWA Standard C509, Latest Edition. High-pressure gate valves shall be required when the pressure exceeds 200 psi. Valve bodies shall be ductile iron; glands shall be the same material as the valve. All external dome and packing bolts shall be stainless steel. The valves shall open by turning counter-clockwise. All valves shall have openings through the body of the same circular area as that of the pipe to which they are attached. Valves shall have mechanical joint ends unless otherwise shown on the plans or directed by the City of Florence.

B. TAPPING SLEEVE AND VALVES: Tapping sleeves and valves shall be designed for a working pressure of 200 psi. The tapping sleeve together with the tapping valve shall be tested at 200 psi for 20 minutes with no loss of pressure.
    1. Tapping Sleeve- Tapping sleeves shall be a two-piece body with mechanical joint type ends, and be so designed as to assure uniform gasket pressure and permit centering of the sleeve on the pipe. Fully gasket stainless steel type tapping sleeves maybe considered for installation on 12" and smaller water mains, but will need to be approved by the City of Florence prior to installation.
    2. Tapping Valves- Tapping valves shall be resilient seated gate valves, rated at 200 psi and conform to the applicable portions of AWWA Standard 509, latest edition except that the seat rings shall be oversized to permit entry of the tapping machine cutter. All external dome and packing bolts shall be stainless steel. Tapping valves shall be ductile iron body, non-rising stem with rubber "O" ring packing seals. Tapping valves shall have a flange on one end for bolting to the tapping sleeve and a mechanical joint type end connection on the slotted standard flange or other adapters for connection to the tapping machine.

C. BUTTERFLY VALVES- Valves 16 inches and larger shall be ductile iron body butterfly valves rated at 250-psi working pressure and conform to AWWA Standard C504, Latest Edition. The City of Florence shall approve all butterfly valves before installation.

D. VALVE STEM EXTENSIONS- A valve stem extension shall be installed by the contractor to bring the operating nut within 2 ½ to 3 ½ feet of final grade. The valve stem extension shall be permanently installed and approved by the City Of Florence.

2.04 VALVE BOXES- All valves shall be provided with valve boxes. Valve boxes shall be of standard, adjustable, heavy-duty cast iron extension type, two piece, 5 ¼" shaft, screw type, and of such length as necessary to extend from valve to finished grade, Tyler #562-S or approved equal. Valve box cover shall be stamped "Water". Tops shall be set at final established grade. If valve boxes are not of sufficient height to bring the top of the box to final grade, a section of 6" ductile iron pipe for pavement areas and 6" PVC for non-pavement areas may be used to extend the valve box to final grade with prior approval from the City of Florence. The length of pipe shall permit the valve box to be adjusted up and down.

2.05 FIRE HYDRANTS- All fire hydrant shall have auxiliary valves for isolating water flow to the hydrant. All fire hydrants and auxiliary valves shall be positively locked to the water main by restrained joints (anchor nipple), hydrant adapters, or other approved method. Hydrant shall be designed to 200-psi working pressure and shall be shop tested to 300-psi hydrostatic pressure with the main valve both open and closed.
The barrel shall have a breakable safety section and/or base bolts just above the ground line. Hydrants shall have a main valve opening of 5 ¼", a 6 inch mechanical joint inlet to be suitable for setting in a trench 3' 6" deep minimum, and shall be the traffic style hydrant so that the main valve remains closed when the barrel is broken off. Hydrant shall have a dry top and shall be self draining, when the main valve is closed. Self-draining hydrants shall drain to dry wells provided exclusively for that purpose. Hydrant drains shall not be connected to storm or sanitary sewers. Hydrants shall be rotatable in a minimum of eight (8) positions in 360 degrees.
All hydrants shall have (2) – 2 ½" hose nozzles and (1) steamer or pumper connection threaded to conform to City of Florence Standards: steamer nozzle shall be NST thread and 2 ½" outlets shall be 3.095 x 6 (Old Cincinnati Thread). The operating nut and the nuts of the nozzle caps shall be square in shape, measuring (1) inch from side to side. Hydrant body shall be painted yellow for all areas unless otherwise directed by the city of Florence. The following hydrants are approved for installation in the City of Florence system*: Clow Eddy, American Darling, Kennedy, or Mueller are approved by the City of Florence.*

2.06 AIR RELEASE VALVES AND/OR TAPS- Air release valves shall be installed in the high points of the water mains where fire hydrants are not installed and as required by the City of Florence. 8" and smaller water mains, tap size and piping shall be ¾", 12" water main-1", and 16" and larger water main- 2". Temporary taps of suitable size may be required at certain points on the water main for the release of air for filling and/or flushing purposes. Temporary taps will be removed and plugged after use.

2.07 STEEL CASING PIPE- Casing pipe shall be steel pipe with minimum yield strength of 35,000 psi. The inside diameter of the casing pipe shall be at least 4" greater than the outside diameter of the carrier pipe joints. Steel casing sections shall be connected by welding, conforming to AWWA C206. Permit needed for going under State highways or railroad tracks. Casing pipe under State highways must meet or exceed KDOT Specs. Casing pipe under railroads must meet or exceed Respector Railroad Company Standards.
Adequate pipe spacers shall be installed to ensure that the carrier pipe is adequately supported in the center of the casing pipe throughout it's length, particularly at the ends

to offset settling and possible electrical shorting. Manufactured pipe spacers shall be installed per manufacture's installation requirements. There shall not be any metallic contact between the casing and carrier pipe. Casing shall have both ends sealed watertight by method of brick bulkhead with mortar.

PART III – INSTALLATION OF WATER MAINS AND APPURTENANCES

3.01 GENERAL- Installation of water mains and appurtenances shall conform to the latest edition of AWWA Standard C600 for DIP, C605 for PVC type pipe.
Water main pipe and fittings shall be laid on a good level foundation of 6" of compacted sand and with no gaps or humps under the pipe or fittings. Excavation shall be done by hand at joints to prevent the pipe and fittings from being supported by the mechanical joint or slip joint bell. Transition between DIP and PVC type pipe shall be made with some type of ductile iron fitting. Repairs to or section replacement of DIP shall not be made using PVC materials. Pipe shall be laid with the bell ends facing in the direction of laying.
The interior of the pipe shall be thoroughly cleaned of foreign matter before being lowered into the trench and shall be kept clean during laying operations. ALL OPEN ENDS ARE TO BE CLOSED WITH CAPS OR PLUGS AT ALL TIMES WHEN PIPE LAYING OPERATIONS ARE NOT IN OPERATION AND AT THE END OF THE DAY. All caps or plugs shall be properly installed and blocked in advance of filling, flushing, and testing mains. All securing and blocking shall be inspected by the City of Florence prior to back filling of ditch.

3.02 CONTRACTORS RESPONSIBILITY- All work performed on any water mains and/or appurtenances that are owned or anticipated to be owned by the City of Florence shall be completed under the direction of the City of Florence adhering to an acceptable plan approved by the City of Florence. The contractor prior to the start of water main work shall give a minimum of 24 hours notice to the City of Florence. If the interruption of service to any customer of the City of Florence's necessary, the Contractor shall make arrangements to provide such shutdown and notify City of Florence customers at the direction of the City of Florence inspector. One set of City of Florence approved plans shall be on the job site during construction. Water main construction will not be permitted to start until all approvals are received and completed. There shall be no deviation from the approved plans without written approval from the City of Florence.

3.03 HANDLING- Pipe, fittings, valves hydrants, and accessories shall be loaded and unloaded by lifting with hoists or skidding so as to avoid shock or damage. Pipe hooks that extend inside the ends of the pipe shall not be used for handling the pipe since they could damage the lining. Under no circumstances shall such materials be dropped. Pipe handled on skid ways shall not be skidded or rolled against other pipe. All bolts shall be tightened with proper wrenches and must have equal tension. The interior of all pipe, fittings and other accessories shall be kept free from dirt and foreign material at all times. When handling PVC pipe, care should be taken to avoid abrasion damage, gouging of the Pipe, rocks, and any stressing of the bell joints or damage of the bevel ends.

3.04 TRENCHING, GRADING, AND COVER- Typically no trenching or laying of pipe or fittings shall be done until pavement (curbs) has been installed. In cases where water main installation is required under new pavement (side streets) main may be installed from trench stakes. When main installation is done prior to the pavement completion, test holes may be required by the City of Florence if valve depth, service taps or other evidence indicates that the minimum or maximum cover requirements are not met or the main is in the wrong location. The contractor will be responsible for digging test holes at intervals required by the City of Florence to verify depth and location.
All trenching, grade and cover work shall conform to lines and grades established, and shall be done according to the drawings and specification, subject to such modifications as the City of Florence may determine to be necessary during the execution of the work. Trenches for water lines shall be of a depth that will provide a minimum cover over the top of pipe of 3' and a maximum of 4' from the final finished grade. Cover over 4' in depth will not be allowed unless approved by the City of Florence to avoid interference with other utilities.
The Contractor shall establish all locations, lines and grades in advance of all work where practical. In addition the Contractor will keep the City of Florence informed a reasonable time in advance of the times and places in which the Contractor intends to work (minimum advance notice shall be one working day, 24 hours).

3.05 TRENCH EXCAVATION

A. TRENCH WIDTH- Widths of trenches shall be held to a minimum to accommodate pipe and appurtenances. The trench width shall be measured at the top of the pipe barrel and shall conform to the following limits:

Earth

Minimum- outside diameter of the pipe barrel plus 12", 6" each side of pipe.
Maximum- Nominal pipe diameter plus 24".

Rock

Minimum- outside diameter of the pipe barrel plus 24": outside diameter of pipe barrel plus 24" @ 12" each side.
Minimum- Larger than 24", nominal pipe size: outside diameter of pipe barrel Plus 24", @ 12" each side.
Maximum- nominal pipe diameter plus 24".

B. BUTTERFLY VALVES- Trench width shall be over excavated 24" on the side that the operating mechanism is located on the butterfly valve when the surrounding area cannot be hand dug.

3.06 BOTTOM PREPARATION- The Contractor shall use excavation equipment that produces an even foundation. For the entire length of the trench, a compacted 6" layer of sand or granular material shall be installed below the pipe. Bell holes and depressions for joints, valves, and fittings shall be dug after the trench bedding has been graded in order that the pipe rest upon the prepared bedding for as nearly its full length as practical. Bell holes and depressions shall be only of such length, depth, and width as required for properly making the particular type of joint.

3.07 UNSTABLE SUBGRADE MATERIAL- When the sub-grade is found to include non-approved backfill material (rock, refuse, organic material, etc.) such material shall be

removed to a minimum of 6" below the bottom of the pipe and backfilled with sand or granular material and thoroughly compacted.

3.08 UNSTABLE SUB-GRADE- If the material forming the trench bottom is not suitable for a good foundation, a further depth shall be excavated and backfilled with an approved backfill material and thoroughly compacted or a foundation shall be constructed using piling, treated timbers, concrete, or other materials as directed and approved by the City of Florence.

3.09 PIPE LAYING- Pipe shall be laid with bell ends facing in the direction of laying. After placing a length of pipe in the trench, the spigot end shall be centered in the bell and the pipe forced home. All pipe shall be laid with ends abutting and true to line and grade. Deflection of PVC pipe joints is prohibited, while DIP pipe you must follow manufacture's suggestions. Caps or plugs shall be installed to prevent the entrance of foreign material whenever pipe laying operations are not in progress.

3.10 PIPE CUTTING- Cutting of pipe for installing valves, fittings, or hydrants shall be done in a neat and workmanlike manner without damage to the pipe or lining. The end shall be smooth and at right angles to the axis of the pipe. Flame cutting of metal pipe by means of an oxyacetylene torch shall not be permitted.

3.11 PUSH-ON JOINTS- The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. The gasket shall then be inserted into the groove in the bell. Before starting joint assembly, a liberal coating of special lubricant, per manufacturers recommendation, shall be applied to the spigot end. (Special lubricant shall be suitable for use in potable water). With the spigot end centered in the bell, the spigot is pushed home per manufacturers recommendations. Insertion of spigot into PVC type pipe bell should be inserted until the reference mark is flush with the end of the bell. Over insertion of the pipe is not recommended per the manufacturer. Pipe joint materials which prevent permeation by petroleum products shall be used within 200 foot of radius of oil or gasoline lines, underground storage tanks, petroleum storage tanks or pumping stations.

3.12 MECHANICAL JOINTS- Mechanical joints for DIP and PVC type pipe require that the spigot be carefully located in the bell. The surfaces with which the rubber gasket comes in contact shall be thoroughly cleaned just prior to assembly. These clean surfaces shall be brushed with special lubricant just prior to slipping the gasket over the spigot end and into the bell. (Special lubricant shall be suitable for use in potable water). The lubricant shall also be brushed on each gasket prior to installation to remove the loose dirt and lubricate the gasket as it is forced into its retaining space. PVC type pipe spigot ends shall be field cut smooth and at right angles to the axis of the pipe for installation in mechanical joint fittings. Care shall be taken to ensure that the PVC plain end is completely home into the mechanical joint fitting.

3.13 RESTRAINED JOINTS- Ball and Socket joints shall be assembled and installed according to the manufacturers recommendations. Other restrained joint-type pipe and fittings shall only be used as approval by the City of Florence. Retaining glands, field lock gaskets, or retaining flanges maybe used as temporary blocking but shall not be

considered as providing a permanent restrained joint or as an alternate for permanent concrete blocking. The use of these types of restraining joints needs to be approved by the City of Florence prior to installation.

3.14 SETTING VALVES- Valves shall be set on a firm solid concrete block foundation so that no load will be transferred to the connection pipe. Valves in water mains shall, where possible, be located on the side property lines extended, unless otherwise shown on the plans. A valve box shall be provided for every valve. The valve box shall not transmit shock or stress to the valve and shall be centered and plumb over the operating nut of the valve. The box cover shall be set flush with surface of the finished pavement unless otherwise shown. All valves boxes with the exception of isolating valves for fire hydrants that are locate in non-paved areas shall have a minimum 2' by 2' by 4" concrete pad, or precast valve pad, unless a smaller pad is approved by the City of Florence.

3.15 SETTING FIRE HYDRANTS- Hydrants shall be located as shown on the plans or as directed by the City of Florence. The location shall provide complete accessibility and minimize the possibility of damage from vehicles or injury to pedestrians. All hydrants shall stand plumb with the pumper nozzle facing the curb. Hydrant shall be set to the established grade, with the traffic flange within 4" above final grade in accordance to. An independent gate valve with valve box shall control each hydrant. All valves used for hydrant control shall be anchored to the branch tee. Fire hydrant barrel extension shall be limited to a one-piece assembly only; stacking two or more extension is prohibited. Maximum fire hydrant barrel extension is 2'.

3.16 CROSS-COUNTRY WATER MAINS- All cross-country water mains shall be installed with tracing wire, except DIP, as described in *Part II, Section 2.01 – D*- Tracing Wire.

3.17 THRUST BLOCKING- All bends over 5 degrees shall be securely blocked against movement with concrete thrust blocks place against undisturbed earth in accordance with *(A Guide for the Installation of Ductile Iron Pipe-Pg 51)*. Thrust blocks shall be approved by the City of Florence prior to backfilling. Water mains shall have concrete thrust block at all pipe intersections and changes of direction to resist forces acting on the pipeline. All concrete thrust blocks shall be poured in such a manner that the bolts can be replaced without disturbing the blocking. All caps or plugs used in mains to undergo hydrostatic test shall be properly installed and blocked in advance of testing mains. The City of Florence representative shall approve all caps or plug installations before the main is subjected to the pressure test. The City of Florence may permit the use of restrained type glands, gaskets, ¾" welded eyebolts @ a 90 degree bend and ¾" threaded rods or other means as prior approved by the City of Florence for temporary restraint only. Permanent concrete thrust restraint shall be provided with any temporary restraint. Duc-Lugs are prohibited for use.

3.18 TRENCH BACKFILL TO 12" OVER PIPE BARREL- All trench excavations shall be backfilled immediately after pipe is laid with the exception of thrush blocks. Compacted sand or granular material shall be used to backfill the trench from the bottom of the pipe barrel to the 12" over the pipe barrel. Backfill material shall be free from cinders, refuse, organic material, boulders, top soil, frozen material, material with a high void content,

and rocks in the opinion of the City of Florence is unsuitable. No flushing of backfill shall be permitted to achieve compaction.

3.19 REMAINING TRENCH BACKFILL IN NON-PAVEMENT AREAS- From 12" above the pipe barrel to the surface, excavated trench material may be used as backfill material or as required by local or county authorities. No material shall be used for backfill that contains frozen earth, vegetable or organic material, debris, rocks 4" or larger measured in any direction, or earth with an exceptionally high void content. Compaction of remaining trench backfill shall be as required by local or county authorities.

3.20 REMAINING TRENCH BACKFILL IN EXISTING PUBLIC ROADWAYS- Roadway opening permits shall be obtained from the city of Florence, or Boone County, or State Department of Highways if applicable. The minimum requirements for backfill beneath all existing public roadways from 12" above the pipe barrel to sub grade shall be "Low Strength Mortar Backfill Material" as backfill material unless City, County or State have additional requirements. The "Low Strength Mortar Backfill Material" shall meet Ky. State Dept. of Highway's Standard 7X. The remaining trench backfill to final grade shall match the existing pavement/surface conditions.

3.21 DISINFECTION- Water Mains designed to carry water for domestic consumption shall be thoroughly cleaned, flushed and disinfected before being put in service and before acceptance by the City of Florence. Disinfections shall be done by the addition of suitable amounts of chlorine or liquid sodium hypochlorite in such amounts to produce a concentration of at least (50) ppm and a residual of at least (25) ppm at the end of 24 hours and followed by thorough flushing. The application shall be as approved by the City of Florence and in accordance with AWWA C651 and applicable Ky. Division of Water requirements. The contractor shall be responsible for de-chlorination of the disinfection water. All non-disinfected fittings used for tie-ins or repairs shall be cleaned and swabbed with hypochlorite disinfecting solution prior to installation.

TABLET METHOD- Calcium hypochlorite tablets shall be installed in each length of pipe to insure a sufficient dosage of 50 ppm based on the following table:

Pipe Size	*Tablets per Length*
6"	2 ea.- 5 gram tablets
8"	4 ea.- 5 gram tablets
10"	6 ea.- 5 gram tablets
12"	8 ea.- 5 gram tablets
16"	14 ea.-5 gram tablets

A food-grade adhesive such as Permatex No. 2 or approved equal shall attach the tablets. Tablets shall be attached inside and at the top of the main with approximately equal numbers of tablets at each end of the pipe. Tablets must be water-soluble.

LIQUID CHLORINE METHOD- Disinfection may be done by the addition of suitable amounts of chlorine in the form of liquid sodium hypochlorite as per AWWA B300 to obtain the results as the previous method described. Note: Permission for this method of disinfection shall be obtained by the City of Florence prior to construction.

3.22 PRESSURE TESTING- The water main being tested shall have all air expelled by additional flushing or the installation of taps on high points in the line. The pressure of the water main shall be increased to obtain a minimum pressure of 150 psi and hold that pressure for 2 hours or you can increase a minimum pressure of 200 psi and hold that pressure for 20 minutes. All test performed for each section shall be witnessed and approved by the City of Florence. In the event any test is performed without an employee of the City of Florence, the Contractor shall be required to test the section again. Pressure shall not drop while testing. While testing at 200psi, if pressure drops, then contractor may need to turn off all hydrant valves, and then retest. If line still drops, then testing in isolated areas may have to be done.

3.23 RESTORATION- Where it is necessary to cut back existing walks of driveways in order to facilitate construction, it shall be restored with like material to connect with the pavement in a manner acceptable to the City of Florence. All disturbed areas will be seeded and covered with straw at the direction of the City of Florence.

3.24 SEEDING- The contractor shall contact the US Department of Agriculture, Natural Resources Conservation Service, 6028 Camp Ernst Road, Burlington, KY. 41005, 586-7903 (Fax 586-6107) for testing and advice before seeding. (Joel Legris)
Unless otherwise advised all disturbed areas shall be fine graded to contour of existing lawn (as photographed before construction). Contractor to fine rake topsoil over lawn and remove stone and debris. *NOTE: POOR TOPSOIL MAY REQUIRE TRUCKED SHREDDED TOPSOIL.*
Seed mixtures shall include fine fescues, perennial rye grass and Ky. Bluegrass from the following selections: Fine Fescue-Spartan, Aurora, Valiant, Biljart, Scaldis, Reliant, or Waldina. Bluegrass-Aspen, Emmundt, Mosa American, Somerset, Vanessa, Eclipse, Majestic, Adelphi, Midnight, or Merit. Perennial Ryegrass-Gator, Tara, Allstar, Pennant, Prelude, Blazer, Derby, Repell, Fiesta, Priemier, Palmer, or BridieII.
Lime- Contractor to apply approximately 80lb/1000 sq.ft. of ground limestone unless other specified by US Agriculture.
Fertilizers- Apply 20lb/1000sq.ft. of 5-20-20.
Seeding- After the fertilizer and lime have be distributed the contractor shall disk or harrow the ground to thoroughly work the moisture into the soil. The seed shall then be broadcast either by hand or by an approved sowing equipment at the rate specified (or 6 lb/1000 sq.ft.)
Mulch- Mulch the area with clean straw or other suitable material. The mulch covering should be thin enough to expose about 50% of the soil surface. To do so, use one bale of straw per 1000 sq.ft. of area. Netting should be used if area is steep or exposed to wind.
Sod- Sod should only be Nursery Grown Sod.
Water- Contractor to keep soil moist for 2 to 3 weeks.
Repair- Any necessary reseeding or repairing shall be accomplished be the contractor prior to final acceptance.
Note: If the construction work is brought to completion when the season is not favorable for seeding then the contractor shall provide temporary cover until season changes.

PART IV – METERS, METER VAULTS AND SPRINKLER PITS

4.01 METERS- There are 2 types of meters in City of Florence system: Domestic meter and Sewer Deduct Meter (Fire Line Bypass Meter). Meters used for domestic water service sizes 5/8" thru 1" shall be installed by the City of Florence; Meters *1 ½" and larger*, the developer will be responsible for installing the approved meter setting, vault, and accessories. City of Florence will install the meters when the appropriate fees have been paid and work is approved by City of Florence. Sewer Deduct Meters and Fire Line Bypass Meters must be purchased from the City of Florence Finance office, and the developer is responsible for installation of these meters. City of Florence shall approve all meter installations. All commercial, apartment, and any other type meter installation will require an automated read meter be installed. Type of Automated reading system will be determined by the City Of Florence Engineering Division.

4.02 METER VAULTS- For meter sizes 5/8" thru 1" the City of Florence will install these. For meter sizes 1 ½" and 2", if not installed in a Sprinkler Pit, these shall be installed in a 30" X 30" meter vault. For meters 3" and larger a Sprinkler Pit is required.

4.03 SPRINKLER PITS- Sprinkler pits shall be required to be installed if one or more of the following conditions exists:
Fire lines—The fire department connection is required by the authority having jurisdiction to be installed near the public right-of-way. An approved double check detector assembly shall be required to be installed.
Domestic Service—1 1/2" or larger domestic water services shall be installed by the contractor/plumber. (Meter provided by the City Of Florence when all fees are paid.)
Domestic Services 1" or smaller shall be installed by the City of Florence.
*A sprinkler pit may not be required to be installed as specified above if one or more of the following conditions exists as determined by the City of Florence the distance between the building and public right-of-way is fifty (50) feet or there is a major conflict with other utilities or public improvements and there are no other available options.
If the sprinkler pit is not required, as approved by the City of Florence, a room of sufficient size with proper drainage will need to be provided for the proper piping installation. No taps or branches will be permitted between the City of Florence isolating valve and the meters. An additional agreement between the Property Owner and the City of Florence will be required if the sprinkler pit is not required by the City of Florence.

4.04 CONTRACTORS RESPONSIBILITY- All work performed on any sprinkler pit and/or appurtenances that are owned or anticipated to be owned by the City of Florence shall be completed under the direction of the City of Florence adhering to an acceptable plan approved by the City of Florence. The contractor prior to the start of work shall give a minimum of 24 hours notice to the City of Florence. If the interruption of service to any customer of the City of Florence is necessary, the Contractor shall make arrangements to provide such shutdown and notify City of Florence customers at the direction of the City of Florence Inspector. One set of City of Florence approved plans shall be on the job site during construction. There shall be no deviation from the approved plans without written approval for the City of Florence.

4.05 EXISTING PITS- Any changes, modifications, or alterations made to an existing pit structure, piping, etc., it shall be brought up to current standards. Compliance subject to the discretion of the City of Florence.

4.06 PLANS- Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and standards. The proposed project may be constructed only in accordance with the approved plans. Plans submitted to the City of Florence for approval shall have a Ky. Professional Engineer or Certified Fire Suppression Technician stamp and signature, where applicable by law. Four (4) sets of plans should be submitted for preliminary review by the City of Florence.

4.07 DESCRIPTION- In general the following specifications are minimum requirements as pit design. Construction may be dictated by location, soil conditions, ground water, topography, etc. Additional provisions may be required upon submission for approval.

4.08 ACCESSIBILITY OF PITS- Accessibility for maintenance and testing of all meter pits shall be provided. A means of access for maintenance vehicles shall be constructed of a hard, all weather surface at least 10' wide and designed to support the heaviest vehicle, within 15' of the pit.

4.09 WATER MAINS ON PRIVATE PROPERTY- Sprinkler pits and appurtenances installed on private property outside of normal conditions, which are going to be maintained by the City of Florence, shall have proper documentation provided for all easement areas. See appropriate sections of City of Florence Rules and Regulations & Standard Drawings for the Installation of Water Mains for procedures.

4.10 MAINTENANCE PERIOD- The Contractor shall be responsible for the maintenance of the installed Sprinkler Pit and appurtenances to City of Florence Rules and Regulations for a period of not less than one (1) year from the date the sprinkler pit is placed in service by the City of Florence. Sprinkler pits will be placed in service when the sprinkler pit is 100% completed to City of Florence Standards. *The property owner is responsible for the Sprinkler Pit and appurtenances to* City of Florence *Rules and Regulations after the one-year period.*

4.11 MINIMUM REQUIREMENTS- Floor slab shall be 6" reinforced concrete sloping at 1/8" per foot to drain or sump pump location. Dimensions of slab shall be 4" larger all around than outside of pit walls. Pit shall be drained by a 4" drain or larger as required; if drain is not applicable then a sump pump (½ hp.) must be installed. Both the drain or sump pump must tie into a storm line, complete with plumbing, or acceptable alternative approved by City of Florence. Walls and Top must be 8" reinforced concrete with #5 bars.

4.12.1 SPRINKLER PIT DEMENSIONS- Minimum inside pit dimensions shall be 8'(L) X 7'(W) X 6'(D). Pit will need to be watertight and the top of the pit will need to be at grade level.

4.13 QUALITY ASSURANCE- Standards: The following publications shall be herby made a part of these specifications.

1) "Specifications for Structural Concrete for Buildings ACI 301-72 (Revised 1975) with Selected ACI and ASTM Referenced, Sp-15 (73)" by the American Concrete Institute.

2) "Placing Reinforcing Bars, CRSI-WCRSI Recommended Practices" by the CRSI-WCRSI Committee on Bar Placing.
3) "Standard Specifications for Road and Bridge Construction by the Ky. Department of Transportation, Bureau of Hwy.
4) Specifications for the Design and Construction Load-bearing Concrete Masonry by the National Concrete Masonry Association.

OR Equal All material referenced are for design purpose only. Any other materials that are "equal" can be used with prior approval from the City of Florence.

4.14 MATERIALS

-Concrete: Ready mixed type meeting KDOT "Class A", 3,500 psi at 28 days compressive strength, 4" maximum slump.
-Reinforcing Steel: Deformed #5 bars conforming to ASTM A615, A616, or A617, grade 60.
-Curing Compound: Acrylic based "non-residual" type meeting ASTM C309 Type 1 not less than 18% to cure, harden and seal concrete.
-Lid: 48" X 54" double door, aluminum lid with locking padlock bar, centered over the meters, Halliday Products Model #A4854 or approved equal.
-Removable Metal Ladder: Removable metal ladder shall be an approved OHSA Type 1 Industrial Heavy, 250-pound aluminum ladder. Ladder must reach from the pit floor and extend into the pit opening. The bottom of the ladder shall be blocked to prevent it from kicking out but still be removable.
-Waterproofing: The exterior side of the pit walls shall be waterproofed with one coat of one of the following materials applied in accordance with the Manufacturer's recommendations: Thoroseal; USS Chemical Tarmastic #102; Koppers Bitumastic Super Service Black; Damchex; Amercoat #78; or an approved equal.
-Voids betweens pipes and chamber walls shall be grouted with a hydraulic cement such as Water plug or an approved equal before waterproofing pit.
-Water stop: A water stop shall be provided in the pit floor to the pit walls.
-Floor Drain: Raised or beehive dome grate, 4" minimum similar to Wade #1634; Josam #7324-N; or an approved equal.
-Pit Drain Line: Cast iron, Schedule 40 PVC, Plastic STM #35 or ductile iron, 4" minimum.
-Alternate To Pit Drain Line: Electrical Submersible Sump Pump, Little Giant, Big John, Stock #3P-639A Model #6-CIA or approved equal. Discharge line must run to nearest storm line and be connected to it. Note: This alternative shall only be used when a drain line is impractical as determined by the City of Florence.
-Packaged, Prefab Sprinkler Pits: Packaged, prefab sprinkler pits are acceptable with approval from the City of Florence.

4.15 WORKMANSHIP- Earth cuts may be used for forms of base slab provided vertical sides are kept true and sharp. All embedded items, reinforcing, piping, etc. shall be secured in place prior to placing of the concrete. Concrete shall be protected from loss of moisture for a curing period of at least 7 days. All concrete shall be deposited within 1-½ hours

following the initial mixing of water and cement. Wall finish may be a rough form finish. Top slab finish shall be wood float with tooled edges.

4.16 ELECTRIC SUMP PUMPS- In general the following specifications are a minimum requirements for the design and installation of Electric Submersible Sump Pumps in meter pits where a normal drain line is impractical.

-Electric Work: All electric work shall be installed according to the National Electric Code and all other applicable codes. All work shall be inspected by an Electrical Inspector and certification provided to the City of Florence.

-Responsibility: The property owner is responsible for providing continuous electric service for the electric sump pump at the owner's expense. The property owner shall be responsible for the maintenance and upkeep of all electrical boxes, conduit, circuit breaker box, circuit breaker, outlet and wiring outside the pit.

-Materials: *Electric Sump Pump*: Electric sump pump shall be UL Listed, Little Giant, Stock #3p639, model #6-CIA. *Electric Junction Box*: Water resistant, UL Listed, PVC electrical box shall be installed on the inside of the pit on the wall closest to the sump pump nearest the ceiling. *Electrical Piping*: Electric piping shall be UL Listed for underground use; rigid or plastic installed at least 18" below grade.

Installation: *Sump Pump Hole*: A 4" deep hole shall be provided in the floor of the pit. *Discharge Piping*: Piping for the water discharge from the electric sump pump shall be plastic or copper. Minimum piping size shall be 1 ½". A 1/8" hole shall be bored above the check valve of the discharge pipe if freezing temperatures will affect the pipe. *Water Discharge*: *Water discharge shall be directed into a storm sewer line or drainage ditch, if this is impractical, water discharge shall be directed on to a 16" X 16" concrete pad it shall not come out on top on the pit*. Electric Service Line: The electric line to the pit shall be only used for the pit sump pump; no other electrical taps shall be made on the line. Manufacturer Instructions: Manufacturer's instructions should be followed for installation.

PART V – BACKFLOW PREVENTION AND INSTALLATION

5.01 Introduction- Unless modified, deleted, replaced, or otherwise changed, the latest published addition of the following documents shall be the accepted standards for materials and/or procedures for the installation of backflow devices.

1) City of Florence Rules and Regulations.
2) AWWA Standards.
3) Foundation for Cross-Connection Control Research, University of Southern California "Cross-Connection Control Manual".

If a conflict exists between referenced sources, the more restrictive requirements shall prevail, the City of Florence shall provide interpretation as requested.

5.02 Program- The City of Florence's program is designed to take every reasonable precaution to protect the public potable water system from any and all cross-connection originating from the customers system, that may allow the backflow of pollutants and/or contaminants, by isolating the customers water service from the public water system. Any cistern connection must be permanently disconnected.

5.03 Plans- Plans are approved subject to the conditions of compliance with all applicable laws, rules, regulations and standards. The proposed project may be constructed only in accordance with the approved plans. There may be no deviation from the approved plans without the written approval from the City of Florence. It is strongly suggested that preliminary plans be reviewed by the City of Florence prior to bidding to save time and money. Plans shall show all plumbing, fire system, industrial and any other uses of the public potable water. Four (4) sets of plans need to be submitted to the City of Florence for review and approval.

5.04 Description- In general the following specifications are minimum requirements for design and installation purposes. Construction may be dictated by location, soil conditions, ground, water topography, etc. Additional provisions may be required upon submission for approval.

5.05 Accessibility of Backflow Prevention Devices- Accessibility for maintenance and testing of every backflow prevention device shall be provided.

5.06 Minimum Requirements- Backflow prevention devices shall be installed in the horizontal at all times. The service line between the meter and the backflow prevention device shall be void of branches or outlets of any kind. The devices shall be installed by a plumber certified by the Northern Kentucky Cross-Connection Association.

5.07 Location- Backflow prevention devices shall be located after the meter before any taps or branches. The location shall be accessible for maintenance and testing purposes. The device shall be installed in a location where it is not subject to abuse from the weather and other damaging factors, etc. All devices shall be installed so the will be easily accessible for testing and repairs. The device must be protected from freezing.

A) Inside of the building located as close as possible to the point where the piping enters the building, down stream of any meters maintained by the City of Florence.
B) Above the ground, in a protective enclosure.
C) In a sprinkler pit with proper drainage. **(Fire Lines Only)**
D) Domestic line backflow devices shall not be installed in a sprinkler pit. Only fire line detector checks can be in sprinkler pit.

5.08 Materials

i. Backflow Prevention Device Assembly: All devices shall be listed and approved by the Foundation for Cross-Connection Control Research, University of California and be approve by the City of Florence. The testable assembly consists of the backflow prevention unit and two shut-off valves. Valves shall be full support for 2" or less and outside stem and yoke, resilient wedge, left hand open gate valves for 3" and larger. The assemble shall not be separated or altered. The type device to be installed shall be determined by the City of Florence based on the degree of existing or potential hazard that the plumbing system poses.

ii. Packaged, Prefab Vaults, or Protective Enclosures: Packaged, prefab vaults or protective enclosures are acceptable when approved by the City of Florence.

iii. Drain Line: Cast Iron, Schedule 40 PVC, Plastic STM #35 or Ductile Iron, 4" minimum. If reduced pressure backflow prevention device is installed in pit (for fire line only), the line shall be sized appropriately.

iv. Protective Enclosures: A protective enclosure shall be provided if the backflow prevention device is to be installed above grade outside of the building. It shall be designed to protect the device from freezing. Adequate space shall be provided for testing, repair and maintenance of the device.

v. Pit Structure: Pit structure shall be built according to City of Florence Standard Drawing & Specification Booklet.

vi. Fire Service Lines: A Double Detector Check Valve Assembly or a Reduce Pressure Detector Check Valve Assembly (depending on hazard class) shall be installed in place of a signal detector check valve. Fire department connections shall be located down stream of backflow prevention device.

vii. Bypass Lines and Multiple Service Lines: All bypass lines and multiple service lines shall be protected with the same type of backflow prevention device.

5.09 Installation- Proper installation of backflow prevention devices and/or methods is essential to an effective cross-connection prevention program. The approved assembly must be installed as one unit. Separation of the various parts is grounds for rejection. The piping arrangement shall be installed according to City of Florence Guidelines & Specifications.

A) Manufacture's Instructions: All devices shall be installed according to manufacturers instructions and as approved by the Foundation for Cross-Connection Control Research, University of Southern California.

B) Flushing of Lines: Water lines shall be thoroughly flushed prior to installing a backflow prevention device to remove all debris.

C) Testing: All approved backflow prevention devices shall be tested and certified that it works properly by a certified backflow technician immediately after system activation and every year thereafter

according to manufacturer's recommendation. Any device failing to meet performance standards, it shall be repaired and retested promptly. If repairs cannot be made promptly, the City of Florence shall exercise prudence in evaluating the hazard that is created and appropriate actions shall be taken. Spare parts should be kept available by the customer to repair devices.

D) Thermal Water Expansion and/or Water Hammer: Downstream of the backflow prevention assembly thermal water expansion and/or water system, water hammer arresters, surge protectors or thermal expansion tanks should be installed as required by the Ky. State Plumbing Code-815 KAR 20:120.

E) Devices Installed Inside Pits: The pit structure and piping arrangement shall be installed according to the City of Florence Guidelines &Specifications Booklet. The type of device installed in pits shall be limited to double check valve type assemblies for Fire Lines Only, except as specified in 5.11.

F) Consumers Requiring Continuous Service: Where a consumer requires continuous uninterrupted service and where it is not possible or practical to provide water service from two separate service lines into a premises, as permitted by the City of Florence, provisions must be made for the installation of two backflow prevention devices in parallel.

5.10 Air-Gap Separation- The only absolute means to eliminate backflow and back-siphonage is through the use of a vertical air-gap separation. Air-gaps should be used whenever possible. The minimum required air-gap shall be measured vertically from the lowest end of the potable water outlet to the flood rim or line of the fixture or receptacle into which it discharges. This air-gap shall be twice the effective inside diameter of the potable water outlet. In no case shall the minimum required air-gap be less than one (1) inch. There shall be no provisions for extending the fixture outlet below the flood level rim.

5.11 Reduced Pressure Backflow Prevention Device- The reduced pressure backflow preventer shall be installed in the horizontal position with adequate space to facilitate maintenance and testing. These devices should never be installed below grade level. The only case where they may be installed in a pit-type structure is where the drain of the box will permit direct drainage to the atmosphere. The drain must be capable of handling the volume of water that can be discharged from the relief port. The relief port shall be located twelve (12) inches above ground level at the point of discharge. Under no circumstances, should the relief port be plugged. This device depends upon an open relief port for safe operation. Care must be taken to protect the device from freezing. When the device is located inside a building, there must be suitable means of taking care of any discharge. If there is a drain provided for the relief valve port, there must be a fixed air-gap separation between the relief port and the drain line.

5.12 Double Check Valve Assemblies- Double check valves shall be installed in the horizontal position, with adequate space to facilitate maintenance and testing. A

double check valve should only be considered when the probability of backflow and the degree of hazard is considered low as determined by the City of Florence. The degree of protection offered by this device is much less than that of an air-gap separation or a reduced pressure backflow prevention device.

PART VI – PHONE READ METERS

6.01 Sprinkler Pit Installation:

-Need to run a 1" conduit pipe from inside sprinkler pit to inside of building.
-Must run a minimum of 3 pair standard telephone line through the conduit pipe, leaving at least 10 feet of extra line in the sprinkler pit and inside building were conduit pipe comes in.
-Must run a phone line with a RJ-11 phone jack, to be mounted where conduit pipe comes inside the building. Also the phone line must have access to regular dial tone and outside line access. Once again, the phone jack must be inside the building.
-We will need at minimum 18 square inches of wall space next to the phone jack for our MIU box.
-Once these requirements are met, then we will come and install our MIU box and make the hook-ups inside sprinkler pit and inside the building.
-Once that is done, then we will program our MIU box to start calling the readings in.

6.02 Meter Vault Installation:

-Need to run a 1" conduit pipe from inside sprinkler pit to inside of building.
-Must run a minimum of 3 pair standard telephone line through the conduit pipe, leaving at least 10 feet of extra line in the meter vault and inside building were conduit pipe comes in.
-Must run a phone line with a RJ-11 phone jack, to be mounted where conduit pipe comes inside the building. Also the phone line must have access to regular dial tone and outside line access. Once again, the phone jack must be inside the building.
-We will need at minimum 24 square inches of wall space next to the phone jack for our MIU box.
-Once these requirements are met, then we will come and install our MIU box and make the hook-ups in the meter vault and inside the building.
-Once that is done, then we will program our MIU box to start calling the readings in.

All Phone Read Installations must be inspected by the City of Florence.

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